

[54] VEHICULAR SPEED CONTROL SYSTEM WITH REDUCED GEAR CHATTER

4,745,823 5/1988 Morita et al. 74/409
4,781,073 11/1988 Bondhus et al. 74/409 X

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FOREIGN PATENT DOCUMENTS

1161526 1/1984 Canada 74/857

[73] Assignee: Ford Motor Company, Dearborn, Mich.

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[57] ABSTRACT

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A vehicle speed control system having phasing circuitry which provides a sequence of electrical phase steps in response to a comparison of actual vehicle speed to a desired vehicle speed. A stepper motor coupled to a pinion shaft rotates by discrete phase steps in response to the phasing circuitry. An anti-backlash/-transfer gear assembly includes a first sprocket gear coupled to a second sprocket gear by integrally formed compression or flexure members which hold the sprocket gears together and a spring assembly which displaces the circumferential teeth of the two sprocket gears relative to one another. Another gear assembly couples rotational movement from the stepper motor to the engine throttle.

[51] Int. Cl.⁵ F16H 55/24

[52] U.S. Cl. 180/178; 74/440; 123/361

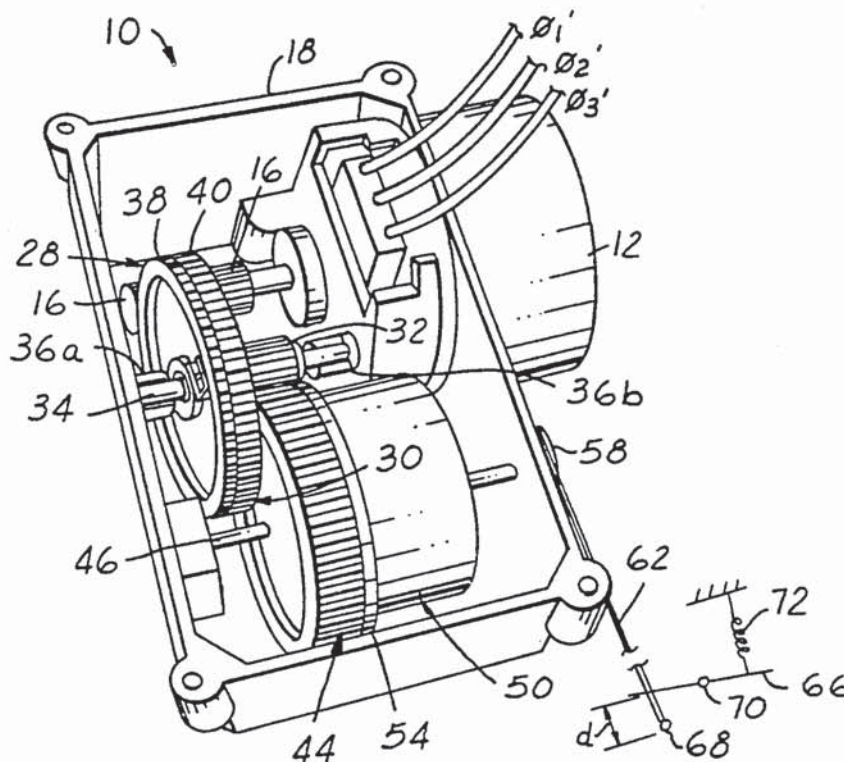
[58] Field of Search 74/857, 402, 403, 409, 74/440, 443; 180/178; 123/361

[56] References Cited

U.S. PATENT DOCUMENTS

- 1,334,517 3/1920 Bryan .
- 1,558,222 10/1925 Beetow .
- 3,229,546 1/1966 Nallinger et al. 74/857
- 3,359,819 12/1967 Veillette et al. .
- 4,640,147 2/1987 Yasukawa et al. 74/409
- 4,688,441 8/1987 Yasukawa et al. 74/409
- 4,739,670 4/1988 Tomita et al. 74/440 X

15 Claims, 5 Drawing Sheets



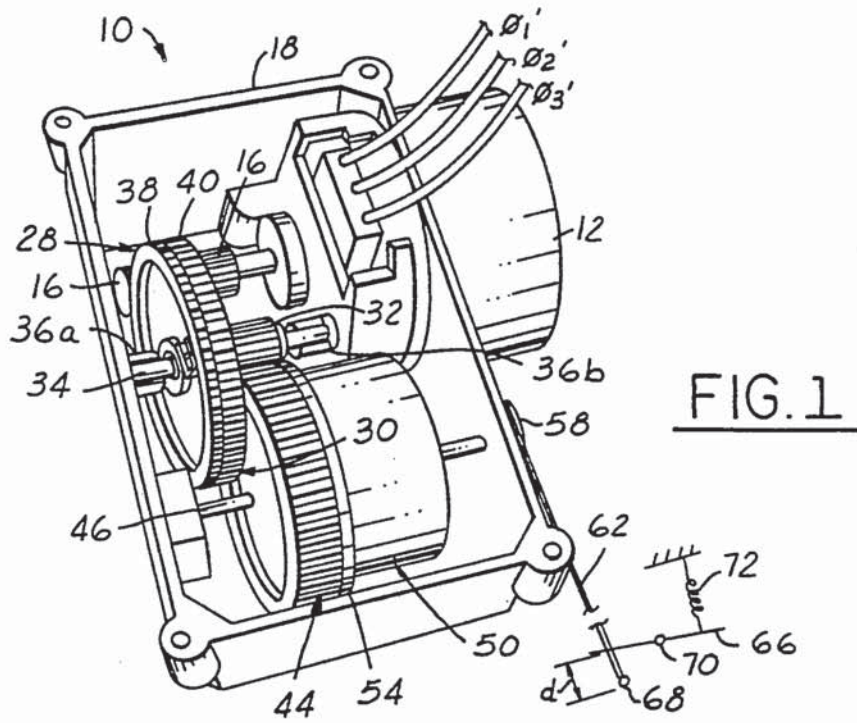


FIG. 1

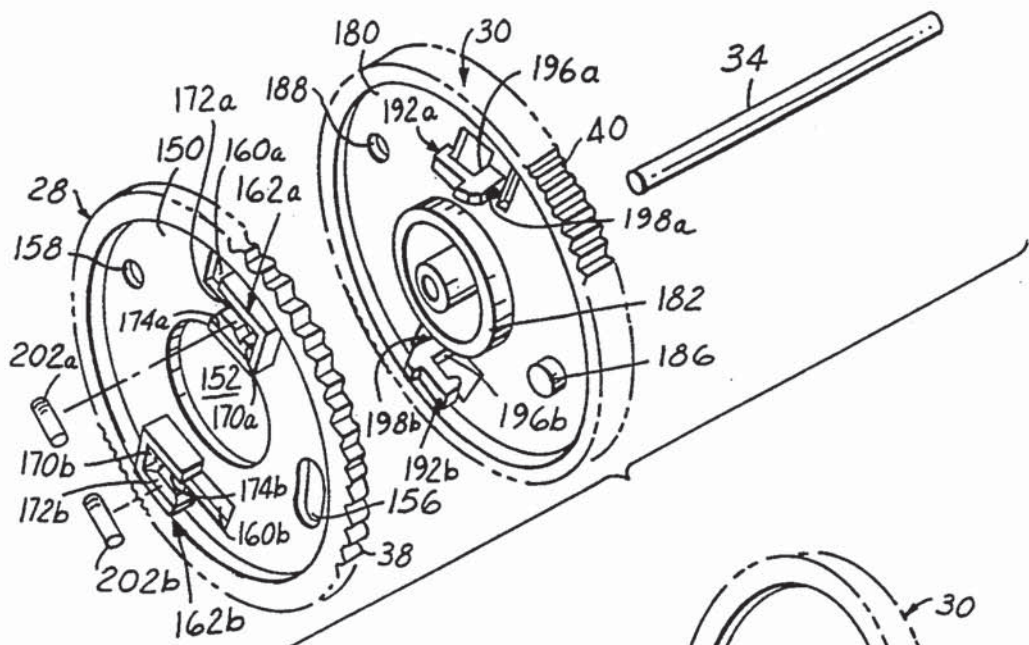


FIG. 3A

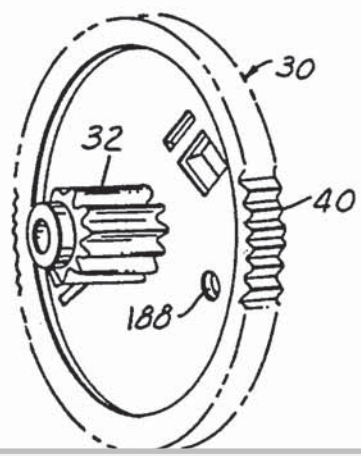


FIG. 3B

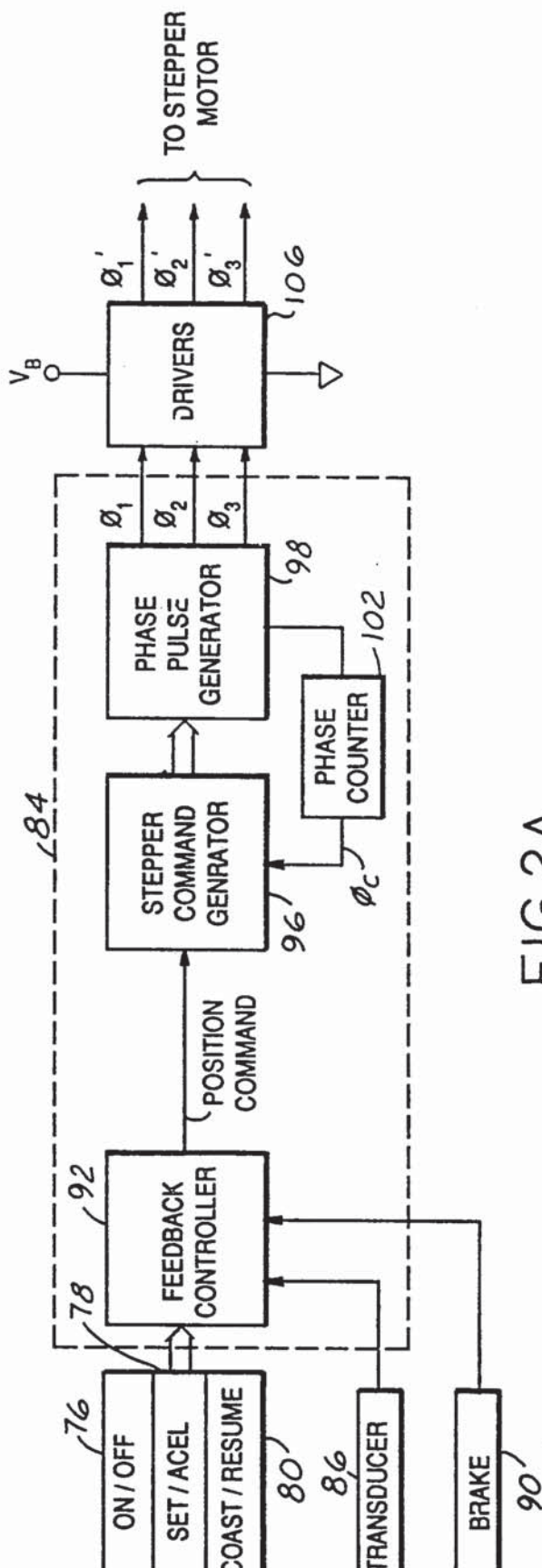


FIG. 2A

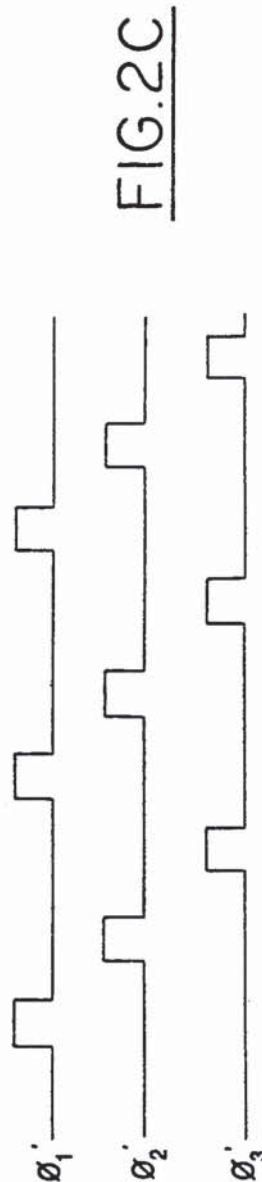
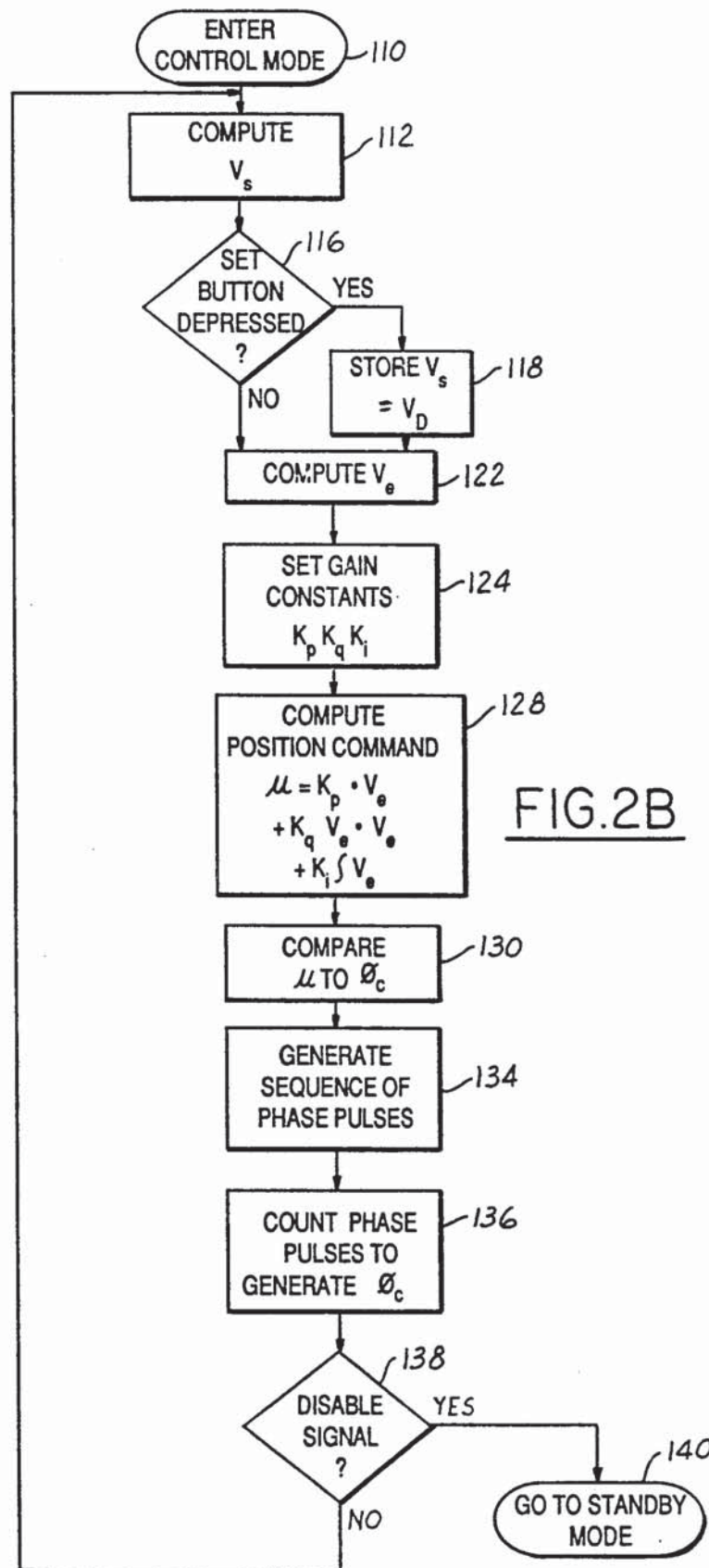


FIG. 2C



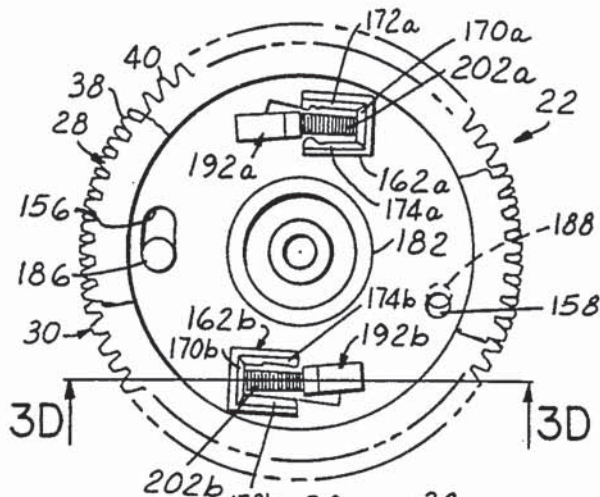


FIG. 3C

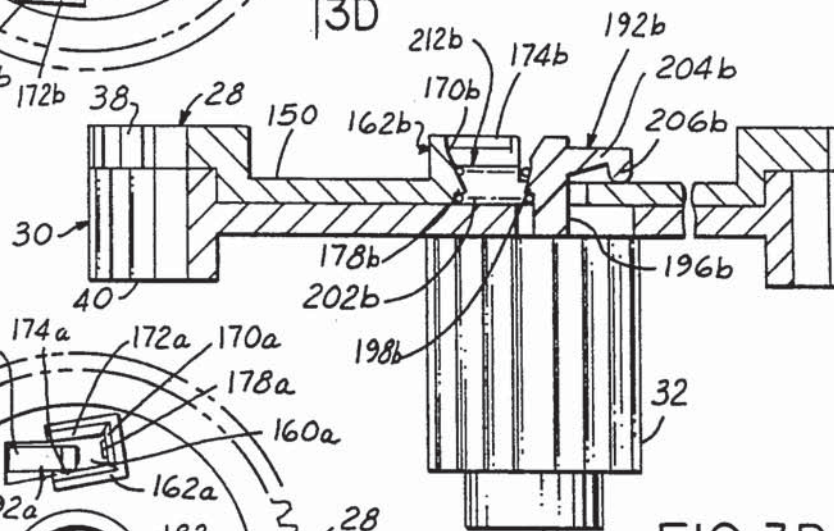


FIG. 3D

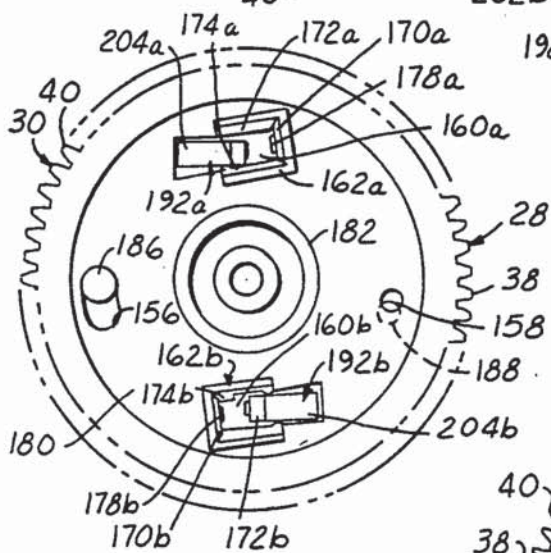


FIG. 3E

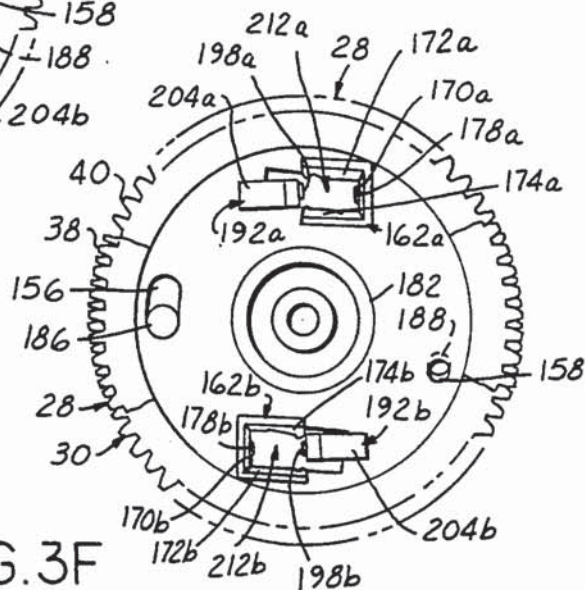


FIG. 3F

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